Claims

1. A DNA construct comprising a DNA sequence encoding Factor VII.

2. The DNA construct of claim 1 wherein at least a portion of said DNA sequence is derived from a cDNA clone of Factor VII.

3. The DNA construct of claim 1 wherein at least a portion of said DNA sequence is derived from a genomic clone of Factor VII.

4. The DNA construct of claim 1 wherein said DNA sequence comprises the cDNA sequence of Figure 1b, from bp 36 to bp 1433.

5. The DNA construct of claim 1 wherein said DNA sequence comprises the cDNA sequence of Figure 1b, from bp 36 to bp 99, followed downstream by the sequence from bp 166 to bp 1433.

6. A DNA construct comprising a first nucleotide sequence joined to a second nucleotide sequence positioned downstream of said first sequence, said first and second sequences derived from cDNA clones of Factor VII, the joined sequences coding for a protein which upon activation has substantially the same biological activity for blood coagulation as Factor VIIa.

7. A DNA construct comprising a first nucleotide sequence derived from a genomic clone of Factor VII, joined to a second nucleotide sequence positioned downstream of said first sequence, said second sequence derived from a cDNA clone of Factor VII, the joined sequences coding for a protein which

upon activation has substantially the same biological activity for blood coagulation as Factor VIIa.

8. A recombinant plasmid comprising a DNA sequence encoding Factor VII.

9. The recombinant plasmid of claim 8 wherein the DNA sequence comprises the cDNA sequence of Figure 1b from bp 36 to bp 1433.

10. The recombinant plasmid of claim 8 wherein the DNA sequence comprises the cDNA sequence of Figure 1b from bp 36 to bp 99, followed downstream by the sequence from bp 166 to bp 1433.

11. The recombinant plasmid of claim 8 wherein at least a portion of said DNA sequence is derived from a cDNA clone of Factor VII.

12. The recombinant plasmid of claim 8 wherein at least a portion of said DNA sequence is derived from a genomic clone of Factor VII.

13. A recombinant plasmid capable of integration in mammalian host cell DNA, said plasmid including a promoter followed downstream by a set of RNA splice sites, said RNA splice sites being followed downstream by DNA sequence encoding Factor VII, said DNA sequence being followed downstream by a polyadenylation signal.

14. A recombinant plasmid capable of integration in mammalian host cell DNA, said plasmid including a promoter followed downstream by a set of RNA splice sites, said RNA splice sites being followed downstream by a first nucleotide sequence joined to a second nucleotide sequence positioned downstream of said first sequence, said first and second sequences derived from cDNA clones of Factor VII, the joined

sequences coding for a protein which upon activation has substantially the same biological activity for blood coagulation as Factor VIIa, the joined sequences being followed downstream by a polyadenylation signal.

15. A recombinant plasmid capable of integration in mammalian host cell DNA, said plasmid including a promoter followed downstream by a set of RNA splice sites, said RNA splice sites being followed downstream by a first nucleotide sequence derived from a genomic clone of Factor VII, joined to a second nucleotide sequence positioned downstream of said first sequence, said second sequence derived from a cDNA clone of Factor VII, the joined sequences coding for a protein which upon activation has substantially the same biological activity for blood coagulation as Factor VIIa, the joined sequences being followed downstream by a polyadenylation signal.

16. Mammalian cells stably transfected with a recombinant plasmid comprising a DNA sequence encoding Factor VII.

17. The cells of claim 16 wherein the DNA sequence comprises the cDNA sequence of Figure 1b from bp 36 to bp 1433.

18. The cells of claim 16 wherein the DNA sequence comprises the cDNA sequence of Figure 1b from bp 36 to bp 99, followed downstream by the sequence from bp 166 to bp 1433.

19. The cells of claim 16 wherein at least a portion of said DNA sequence is derived from a cDNA clone of Factor VII.

20. The cells of claim 16 wherein at least a portion of said DNA sequence is derived from a genomic clone of Factor VII.

21. The cells of claim 16 wherein said plasmid includes a promoter followed downstream by a set of RNA splice sites, said RNA splice sites being followed downstream by a DNA sequence encoding Factor VII, said DNA sequence being followed downstream by a polyadenylation signal.

22. The cells of claim 16 wherein said plasmid includes a promoter followed downstream by a set of RNA splice sites, said RNA splice sites being followed downstream by a first nucleotide sequence joined to a second nucleotide sequence positioned downstream of said first sequence, said first and second sequences derived from cDNA clones of Factor VII, the joined sequences coding for a protein which upon activation has substantially the same biological activity for blood coagulation as Factor VIIa, the joined sequences being followed downstream by a polyadenylation signal.

23. The cells of claim 16 wherein said plasmid includes a promoter followed downstream by a set of RNA splice sites, said RNA splice sites being followed downstream by a first nucleotide sequence derived from a genomic clone of Factor VII, joined to a second nucleotide sequence positioned downstream of said first sequence, said second sequence derived from a cDNA clone of Factor VII, the joined sequences coding for a protein which upon activation has substantially the same biological activity for blood coagulation as Factor VIIa, the joined sequences being followed downstream by a polyadenylation signal.

24. A method for producing a protein having the same biological activity for blood coagulation as ~~mediated by~~ Factor VIIa, comprising:

establishing a mammalian host cell which contains a DNA construct comprising a DNA sequence encoding Factor VII;

growing said mammalian host cell in an appropriate medium;

isolating the protein product encoded by said DNA construct produced by said mammalian host cell; and activating said protein product to generate a protein having the same biological activity for blood coagulation as Factor VIIa.

25. The method of claim 24, including amplification of the DNA sequence by cotransfection of the host cell with a gene encoding dihydrofolate reductase, wherein the appropriate medium comprises methotrexate.

26. The method of claim 24 wherein said protein product is activated by reacting the protein with a proteolytic enzyme selected from the group consisting of Factor XIIa, Factor IXa, kallikrein, Factor Xa, and thrombin.

27. The method of claim 24 wherein at least a portion of said DNA sequence is derived from a cDNA clone of Factor VII.

28. The method of claim 24 wherein at least a portion of said DNA sequence is derived from a genomic clone of Factor VII.

29. The method of claim 24 wherein said DNA sequence comprises the cDNA sequence of Figure 1b, from bp 36 to bp 1433.

30. The method of claim 24 wherein said DNA sequence comprises the cDNA sequence of Figure 1b, from bp 36 to bp 99, followed downstream by the sequence from bp 166 to bp 1433.

31. The method of claim 24 wherein said DNA sequence comprises a first nucleotide sequence joined to a second nucleotide sequence positioned downstream of said first sequence, said first and second sequences derived from cDNA clones of Factor VII, the joined sequences coding for a protein

which upon activation has substantially the same biological activity for blood coagulation as Factor VIIa.

32. The method of claim 24 wherein said DNA sequence comprises a first nucleotide sequence derived from a genomic clone of Factor VII, joined to a second nucleotide sequence positioned downstream of said first sequence, said second sequence derived from a cDNA clone of Factor VII, the joined sequences coding for a protein which upon activation has substantially the same biological activity for blood coagulation as Factor VIIa.

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